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Locational Marginal Pricing – Call for Input.

About RenewableUK
RenewableUK's members are building our future energy system, powered by clean electricity. We bring them together to deliver that future faster; a future which is better for industry, bill payers, and the environment. We support over 400 member companies to ensure increasing amounts of renewable electricity are deployed across the UK and to access export markets all over the world. Our members are business leaders, technology innovators, and expert thinkers from right across industry.

RenewableUK welcomes the opportunity to provide a response to this call for input on locational marginal pricing. We have provided input to the questions asked below but would first like to make some overarching comments on Ofgem's locational pricing assessment process and central question.

The workplan presented on slide 10, 'case for change' sits outside of any the scheduled workshops. We have a number of questions about the ongoing process:

- Is there additional documentation that sets out the detail the case for change or is the 'case for change' the result of the ESOs work on this topic?
- Why is feedback from the first workshop incorporated into a stage proceeding the second workshop, would this risk feedback from first workshop becoming redundant?
- Is this assessment aligning with the REMA work being undertaken by BEIS or will Ofgem's work be conducted in isolation?

Furthermore, will the cost and benefits of locational pricing be assessed against the benefits that could be introduced through ongoing reforms, i.e., an enhanced status quo? Ofgem has committed to working with industry to reform TNUoS. The recently-launched TNUoS Task force, and the review of TNUoS in a decentralised net-zero energy system is expected to be completed in a long-term review. Given the effort the industry has already put into TNUoS reform, it is likely that going ahead with this reform will create less disruption than implementing a new mechanism that will create more uncertainty for market participants.

Given the huge potential impact of any decision to introduce locational pricing – on energy costs and resilience and achievement of net zero – it is important that Ofgem brings in a wide range of independent experts to assist in its modelling. Whilst we can understand why Ofgem may have chosen to use the same consultants as used by NG ESO, and we have no reason to doubt their independence and impartiality, we believe it would be healthy for Ofgem to commission modelling and analysis from other firms who could bring new insights and mindsets to the work, or open up the input assumptions to industry review.

Ofgem's central question for this assessment is, "will introducing locational granularity into the wholesale electricity market enable a fully flexible, low carbon, low-cost system?". RenewableUK would welcome greater clarity on this question as there is a trade-off between exposing investment in low carbon assets to risks from changes in wholesale market design, and securing that investment quickly at low cost. It would be useful to explore how locational granularity in the wholesale electricity market would address this.

We believe that the objective of future market design is to deliver a net zero energy system, by the target dates and at the best possible value to consumers. The future market arrangements must provide a framework to support investment in, and operation of:

- A diverse mix of low carbon generation to deliver the foundation of the net zero system, and
- the right solutions to ensure the operability of a system with a high level of variable generation, through a wide range of flexibility options and services.

An alternative to the central question is how much benefit can really be derived on the generation side by the introduction of locational granularity into the market. The net zero strategy is to reach a generation mix that is predominately made up of renewable and nuclear, which are largely unable to respond to locational signals for siting decisions for reasons presented below. Presumably there will therefore be some overlaying mechanisms that act to blunt the locational signals, which begs the question of where the benefits of locational pricing would really be.

We would welcome the opportunity to discuss further with Ofgem on any of the comments raised in this letter. If this is of interest, please do not hesitate to get in touch.

Yours Sincerely

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1. The key opportunities associated with introducing more granular locational pricing in GB.

Given the potential uncertainty and disruption around the implementation of locational pricing, we welcome Ofgem's intention to undertake further rigorous and quantitative analysis to better understand the potential benefits, including the scale of benefits and the distributional impacts.

RenewableUK's current position is that the scale of benefits from introducing locational pricing may be relatively modest, at least when compared against an enhanced status quo, and is unlikely to outweigh the costs resulting from the risks and challenges that we set out in this response.

2. The key implementation challenges, risks and mitigations.

Impacts of locational pricing on the cost of capital

We believe that the impacts of locational pricing on the cost of capital and investor confidence is a fundamental consideration in assessing the case for locational pricing. This needs a more comprehensive analysis than currently proposed, as it is not a sensitivity, it is fundamental to delivering net zero at least cost.

The impacts need to be considered across two timescales:-

Transitional risks for projects deploying during the preparation and introduction of LMP.

If the NG ESO assumption is correct (locational pricing can be delivered in 5 years, which is highly questionable) then it is likely to be delivered by 2027/2028 at the earliest. Developers might have sufficient knowledge of new arrangements to model potential outcomes by 2026, but will probably not have adequate evidence of actual results of locational pricing until early 2030s.

However, the lead time from site selection to FID could be up to 10 years, plus another 3 years up to start of operations for large CfD projects. As a result, most of the new generation investment required to achieve a net zero power system, commissioning into the late 2030s, will likely be impacted by uncertainty during the transition period. If this generation is not subject to locational price signals, then much of the purported benefit of locational pricing would be lost. However, if it is to be subjected to locational price signals, then developers need early certainty when they make key commercial decisions of what these price signals will be over the life of their asset. Developer certainty is needed to mitigate the risk that a higher cost of capital would cause a more expensive cost to customers of delivering net zero. If it is not possible to provide this certainty, then generators should not be exposed to unpredictable LMP price signals because they would have no realistic way of either responding to the signal or managing the price risk.

The following aspects that need to be considered further in addressing the impacts on cost of capital;

- Grandfathering arrangements will need to be in place for existing investors and for projects in the development cycle now. Investment decisions on projects coming out of ScotWind and round 4 have been made on current market arrangements.
- Consideration of the whole CfD design is needed. The CfD has been critical to securing investment in renewables, yet it is unclear how the CfD process would function given the uncertainty on reference prices. For example: how would the best bids be awarded; how would tender budget be determined; how negative pricing rules will be administered; and how would the settlement payments take place? How can support payments be decoupled from the incentive to generate? Will non-CfD generators also be protected?
- How might Financial Transmission Rights (which in the US are typically no more than 3 years and baseload) work in practice for 15+ years for assets that won't run baseload.

Risks for projects deploying during a "steady-state" operation of LMP.

Compared to the current market arrangements, most commentators have concluded that higher volatility, higher risk, and greater uncertainty in pricing are all much more likely with a more granular pricing. Each local market will be much smaller, so liquidity is likely to be lower and the impacts of step changes in supply, demand, network build and availability will be proportionally much greater than on a national scale – making nodal or zonal prices significantly challenging to forecast in the longer term. This will tend to produce a more volatile and uncertain clearing price outcomes, and in particularly important for renewable generation where billion-pound investments are made at the outset of the asset life based on a relatively stable revenue outlook.

This translates directly into project revenue risk and higher cost of capital. Developers will still come forward, but will require higher returns, with correspondingly higher CfD costs passing on higher costs to consumers even after a new "steady state" has been implemented.

In a steady state system with locational pricing, in principle there may be no higher risk than other market arrangements, as long as generators have access to long duration FTRs and well adapted CfD, so can accurately project with confidence, within a stable market regime, what future costs and revenues will be.

However, the transformation to a net zero energy system will take many decades. As a result, the transitional phase will last for the foreseeable investment horizon for years to come, and LMP will have inherently higher risks during that time.

Scotland: Impacts of locational pricing on in-flight projects and new generation

It is important to highlight that the implementation of a LMP system would tend to disadvantage northern generators and southern consumers compared to current arrangements. The methodology will signal generators to locate near to demand, in locations where renewables resource is not necessarily available – encouraging more gas generation close to demand centres. This means that the need and value of a diverse mix for security – both by technology and geography – is not reflected in the locational pricing model, which is a potential shortfall in the assessment of LMP and needs to be addressed as a priority.

The implementation of LMP will mean that generation in Scotland will face increased risk compared to generation located in the rest of the UK, unless price signals move demand from southern to northern areas effectively, which may be unlikely. Developing renewable potential in Scotland is reliant on GB policy/regulatory frameworks, thus new market arrangements that could potentially harm local government ambitions should be assessed carefully.

Financial Transmission Rights uncertainties and challenges

The financial instruments such as Financial Transmission Rights (FTRs) are said to be a hedge against the revenue uncertainty that market participants would be exposed to in a nodal locational pricing market. The extent to which a FTR market could be effectively established and mitigate revenue uncertainty is unclear, and assessments of locational pricing should not simply assume that FTRs will resolve uncertainties or lead to less uncertainty (as the ESO appears to have concluded in their assessment) than the status quo, or the market conditions following any reforms resulting from the TNUoS task force.

3. The proposed approach to modelling zonal and nodal market designs.

Modelling CFD Contract Holders

There is a fundamental issue in modelling CFD contract holders, which is that the modelling assumptions do not take account of the relative timing of siting decisions for new CFD projects. CFD contracts run only for 15 years, and it is the pattern of charging across the whole project life that will form the basis of the investment and siting decision for a CFD project. The location of a generator must be determined more than 10 years ahead of first generation, so if there is to be an efficient locational signal, then the aggregation of the whole project life of locational prices needs to be communicated to the developer 10 years in advance of first operation. This is extremely challenging for any cost signal, let alone one that is inherently volatile.

Additionally, renewable technologies have limited flexibility over siting decisions, with the location determined largely by physical and/or administrative factors. In the case of offshore wind, location is underpinned by the formal leasing processes operated by Crown Estate Scotland and The Crown Estate in England and Wales and formalised through Agreements for Lease. In these circumstances it is not apparent how the locational pricing signal could influence siting decisions for new generation capacity, or whether this signal is efficient. In practice, the charging may have negligible direct impact and serve simply to act as a tax, potentially increasing costs to consumers but without any material benefit. It is not clear how these uncertainties will be captured in the analysis.

Geospatial analysis of UK renewable energy with current planning agreements

In a liberalised electricity market such as the UK, infrastructure and generation assets are granted planning consent by different authorities, which leads to multilevel decision making. An example is the case of onshore wind. Today, the planning and consenting systems for onshore wind developers are more favourable in Scotland than in England and Wales. The planning regime in England was changed in 2015 with the express intention of preventing the deployment of onshore wind. Therefore, it is expected that most of the onshore wind needed to meet our climate targets will be located in Scotland.

Similarly, the recent results of the ScotWind leasing round will result in up to 25GW of capacity being built out in Scottish waters in the 2030s, and this will be a substantial part of the UK offshore wind deployment needed to reach net-zero.

We believe that LMP must be assessed against the current planning system that exists across the UK. Otherwise, the reform will result in distortions that ultimately will fall onto energy consumers to pay. In theory, LMP only works perfectly in the simplified economic conditions of "perfect competition", in a centralised energy system where planning decisions are taken by one entity in a coordinated way, none of which applies in practice.

There is a need for transmission planners to anticipate generation investment, and we can see increased uncertainty for renewables in an LMP system. This is mainly because generators would have different signals to consider before deciding on a site. These signals will include the market signal of the LMP system, availability of resource, local planning restrictions, etc.

Due to the geography of the UK, demand centres and availability of renewable resource are located at opposite ends of the country - renewable resource is greater further north and demand centres are greater further south. This means that renewable developers are unable to respond to the market signal from an LMP system. If a market signal cannot be responded to, then it is not achieving its purpose.

Therefore, it is important that analysis explores the geographic availability for potential new solar and wind energy by considering different levels of exclusivity for land and marine use. We would point to work done by Carbon Free Europe on assessing geographic availability for new sites as a reference[1].

NOA and HND

Input data in the model will use the latest NOA and ETYS available. RenewableUK would note that these sources don't account for the 25GW of potential capacity of ScotWind by the end of the decade. Furthermore, the ESO will shortly publish the Holistic Network Design. Any input data around transmission network will have to be updated to reflect these or the conclusions from the model may be skewed.

Assessment of the benefits of LMP against enhanced Status Quo

We believe that the cost benefits of locational pricing must be assessed against the benefits that could be introduced through ongoing reforms.

TNUoS Reform

Ofgem has committed to reform TNUoS. The TNUoS task force has been recently launched and the review of TNUoS in a decentralised net-zero energy system is expected to be completed in a long-term review. Given the effort the industry has already put into TNUoS reform, it is likely that going ahead with this reform will create less disruption than implementing a new mechanism that will create more uncertainty for market participants.

[1] European Land-Use Constraints in a Net-Zero World (carbonfreeeurope.org)

New Market mechanism for long duration energy storage
We understand that one of the reasons for proposing LMP is to encourage better site signals for flexibility assets, but the industry has been exploring new ways to attract more flexible assets into the system for a while now. For the case of long duration energy storage, some stakeholders have strongly advocated for Government to introduce a new market mechanism for long duration energy storage and have advocated to include these technologies in the Capacity Market. The industry is currently waiting for BEIS to respond to the consultation published last year, and if Government response is positive, the deployment of these technologies could be unlocked.

Impacts on consumers

Impacts on consumers should be modelled not only as a total value but looking at the impacts on different consumer archetypes. For example, 'consumers' should be subdivided into:

- Domestic consumers
- SME
- Industrial and commercial (I&C)
- Energy intensive industry (EII).

Ofgem should also provide more detail on how it proposes to model the elasticity of demand for different categories of consumers. This should include time-shifting of consumption and absolute increases/decreases in consumption in response to price changes. This will be an essential input to modelling of consumer surplus and the extent to which locational pricing can lead to greater economic efficiency.